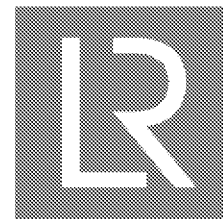


## FOBAS - Sample Analysis Report



CLAUS-PETER OFFEN TANKSCHIFFFAHRT

Our Ref: 14-000065-0-UKHO - UMZ      Report Status: << RED>>  
Vessel: CPO INDIA      IMO: 9434228

**Sample Dispatch Date:** 23 DEC 2013  
**Lab Receipt Date:** 02 JAN 2014  
**Courier Used:** DHL : 5783232733  
**Dispatched From:** HOUSTON, TX - USA

Sample	1	2
Port	LAKE CHARLES	LAKE CHARLES
Sampling Date	20 DEC 2013	19 DEC 2013
Supplier	BOMINFLOT	BOMINFLOT
Barge/Inst	S-500	MMLP 2603
Sample Point Type	MANIFOLD	MANIFOLD
Sampling Method	DRIP	DRIP

### Advised Bunker Details

Viscosity cSt	300.0	NOT STATED		
Density @ 15°C kg/l	0.9903	0.8530		
Sulphur	0.96	0.0028		
Quantity MT	230	110		
Seal Number Lab	1083136	1083448		
Tag Seal Numbers Lab	1339561/1339562	1139615/1139616		
Seal Number Vessel	1083138	1083450		
Seal Number Supplier	1083137	1083449		
Seal Number MARPOL	1083139	1144536		
	Required	Tested	Required	Tested
	1	<< RED>>	2	<< AMBER>>
ISO-F Grade( 2005 )	RMG380LS	---	DMALS	DMA
K Viscosity at 40oC	cSt -	-	6.0	2.822
K Viscosity at 50oC	cSt 380	389.8	-	-
K Viscosity at 100oC calc	cSt	36.0	-	-
Density @ 15°C	kg/l 0.9910	0.9885	0.8900	0.8540
Water Content	% v/v 0.50	0.10	-	< 0.05
Ash Content at 550oC	% m/m 0.15	0.043	0.01	< 0.010
Micro Carbon Residue	% m/m 18.0	16.49	-	-
Total Sediment	% m/m 0.10	0.24	-	-
Total Sediment Existent	% m/m	0.11	-	-
Toluene Wash	% (m/m)	0.10	-	-
Net Specific Energy	MJ/kg	40.89		42.71
Gross Specific Energy	MJ/kg	43.22		45.50
Colour	n/a -	-		Red
Appearance	-	-		Clear and Bright
Sulphur Content	% m/m 1.00	0.89	0.10	< 0.03
Pour Point	°C 30	< 6	0	< -9
CFPP	°C -	-		< -9
Flash Point	°C 60	> 70.0	60	> 70.0
CCAI	Index	849	-	-
MCR 10%	% m/m -	-	0.30	< 0.01
Cetane Index	Index -	-	40	46
Silicon	mg/kg	30	-	-

Aluminium	mg/kg		24	-	-
Vanadium	mg/kg	300	22	-	-
Sodium	mg/kg		23	-	-
Iron	mg/kg		30	-	-
Phosphorus	mg/kg	15	15	-	-
Lead	mg/kg		< 1	-	-
Calcium	mg/kg	30	10	-	-
Nickel	mg/kg		17	-	-
Zinc	mg/kg	15	3	-	-
Potassium	mg/kg		5	-	-
Magnesium	mg/kg		1	-	-
Aluminium + Silicon	mg/kg	80	54	-	-

Comments: Sample 1

RED

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1. Total Sediment Potential (TSP) as determined exceeds the limit of 0.10 % m/m as specified in ISO 8217 for an ISO-F-RMG 380 grade.
2. Extended analysis by Total Sediment Existent (TSE) and Toluene Wash indicates that the high sediment result is largely due to extraneous dirt. This may result in heavy loading on purifiers/filters and deposition in tanks which should be monitored and operational adjustments made as necessary.
3. In view of the above and based on this sample only, we would recommend that this fuel to be put into use whilst other fuel remains onboard so that if the problems, as described above, are severe and unmanageable then there is an alternative fuel available.

OTHER COMMENTS

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4. Above average silicon and aluminium should reduce to acceptable limits of 10-15 mg/kg during onboard treatment. Separator flow rates and operating arrangements should be optimised. Before and after separator samples should be taken to confirm adequate reduction in abrasive elements is being achieved.
5. Minimum transfer approximately 35 to 40 Deg C
6. The fuel as tested complies with the Revised MARPOL Annex VI reg. 14.4.2
7. Fuel preheat approximately 138 Deg.C for 12 cSt viscosity at the engine fuel rail.

Comments: Sample 2

AMBER

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1. The fuel as tested corresponds to an ISO-F-DMA, grade. While results are within the limits for an ISO-F-DMA, the fuel requires specific attention as directed below.
2. Viscosity is below average for marine gas oils. Pay particular attention to the ambient / point temperature of the reciprocating and rotary fuel system components with respect to maintaining above minimum viscosity requirements to ensure the hydrodynamic film is being retained for good lubrication.
3. Attention should be given to fuel system component condition when changing over to low viscosity distillate fuels from heavy fuel optimised operations, in way of fuel pump leakage and reduced injection pressures. In addition initial filter blockages, due to solvent nature of distillate fuels cleaning heavy fuel oil lines may occur. Allowances should be made for possible initial start up and manoeuvring irregularities.
4. In view of the low sulphur content particular attention should be given to the fuel's lubricity characteristic with respect to its possible impact on the fuel pump/injector components. We recommend that the fuel supplier is requested to provide a lubricity value. An additional lubricity characteristic test on the bunker sample may be carried out, which we can undertake if so required, please advise. Please do not hesitate to contact us should you require further guidance in this matter.

OTHER COMMENTS

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5. The fuel as tested complies with the Revised MARPOL Annex VI regulation 14.4.2

Note: The accuracy of the results obtained are dependent on the sample tested being truly representative of the fuel as loaded. To draw representative samples please refer to the FOBAS Sampling Procedures Manual. For further information on the MARPOL Annex VI Reg. 14 & 18 requirements and its on-going developments, please contact your local Lloyd's register FOBAS office or contact us directly on [fobas@lr.org](mailto:fobas@lr.org)

This report is also available at <https://www.fobas.com>

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